SVKM's
D. J. Sanghvi College of Engineering

Program: B.Tech in Biomedical Engineering **Academic Year: 2022** **Duration: 3 hours**
Date: 11.01.2023
Time: 10:30 am to 01:30 pm
Subject: Medical Imaging (Semester VII) **Marks: 75**

Instructions: Candidates should read carefully the instructions printed on the question paper and on the cover page of the Answer Book, which is provided for their use.
(1) This question paper contains two pages.
(2) All Questions are Compulsory.
(3) All questions carry equal marks.
(4) Answer to each new question is to be started on a fresh page.
(5) Figures in the brackets on the right indicate full marks.
(6) Assume suitable data wherever required, but justify it.
(7) Draw the neat labelled diagrams, wherever necessary.

Question No.		Max. Marks
Q1 (a)	Describe the adjustable transmit Focus ultrasound transducer: **OR** Describe B and M mode of ultrasound machine using a block diagram.	[10] [10]
Q1 (b)	Describe the following ultrasound characteristics: i) Amplitude ii) Intensity and Power	[05]
Q2 (a)	Describe FID (Free Induction Decay) signal obtained in MRI. **OR** Describe TE (Echo Time) and TR (Repetition Time) in MRI.	[08] [08]
Q2 (b)	Describe principles of doppler ultrasound. Describe continuous wave doppler method and pulsed wave doppler method.	[07]
Q3 (a)	Describe magnetic dipole moments in physics of MRI machine. **OR** Describe slice selection, frequency encoding and phase encoding in MRI.	[10] [10]
Q3 (b)	Describe the factors on which MRI image quality depends.	[05]
Q4 (a)	Describe spin echo pulse sequence in MRI along with a neat diagram.	[10]
Q4 (b)	Discuss the need of hybrid imaging modalities. **OR** Write a short note on SPECT/CT.	[05] [05]

Q5 (a)	Describe water signal suppression in magnetic resonance spectroscopy. **OR** Discuss single voxel and multivoxel spectroscopy.	[10] [10]
Q5 (b)	Discuss applications of PET/CT hybrid imaging.	[05]